

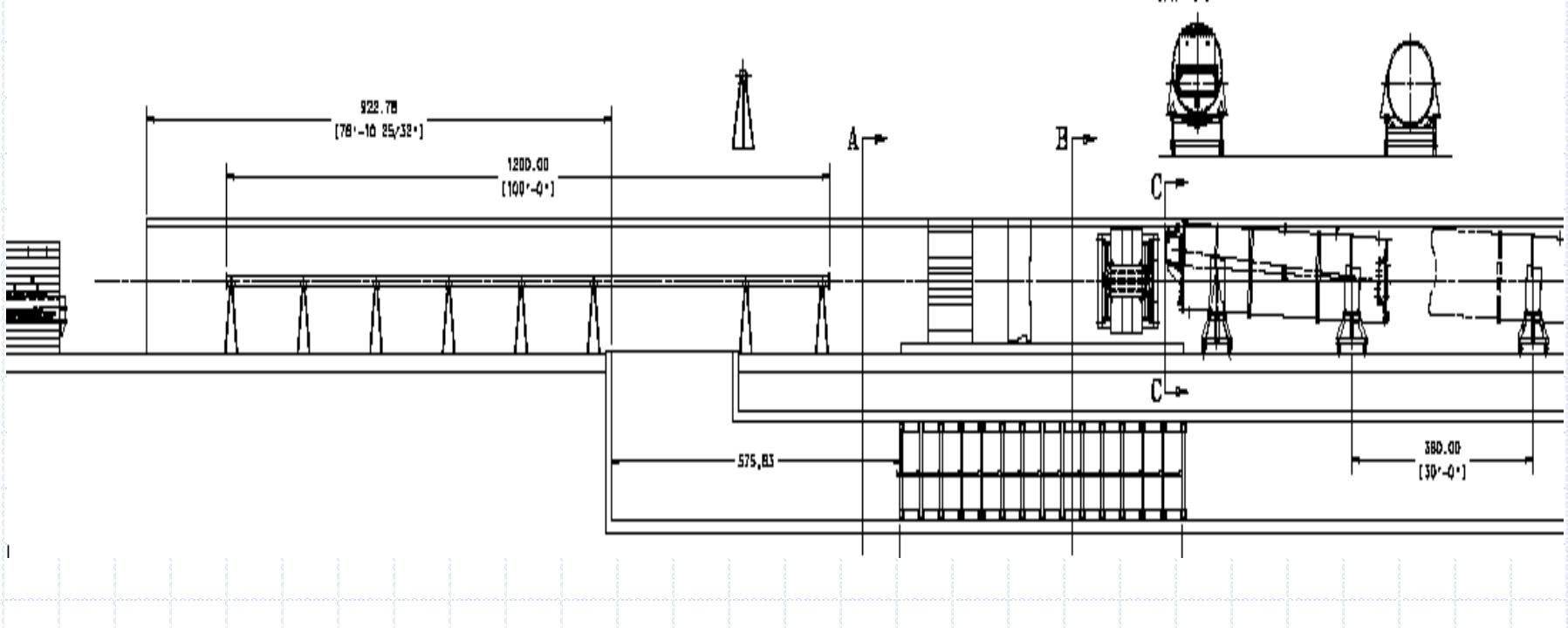
Beam Particle Identification

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Task-Identify Beam Species

- Primary beam 120 GeV/c Protons
- Secondary beam
 - Selectable momentum 5-115 GeV/c
 - Contains e, μ, π, k, p



Methods

Timing

$$t = d / \beta$$

- Low energy, up to 15 GeV/c
- Simple scintillator paddles

Threshold

$$\beta_{thres} = 1/n$$

- Covers most of range ~10 to 70 GeV/c
- No imaging
- Simple mirror
- Single Phototube
- Simple alignment

CKOV Angle

$$\sin \theta_c = 1/n\beta$$

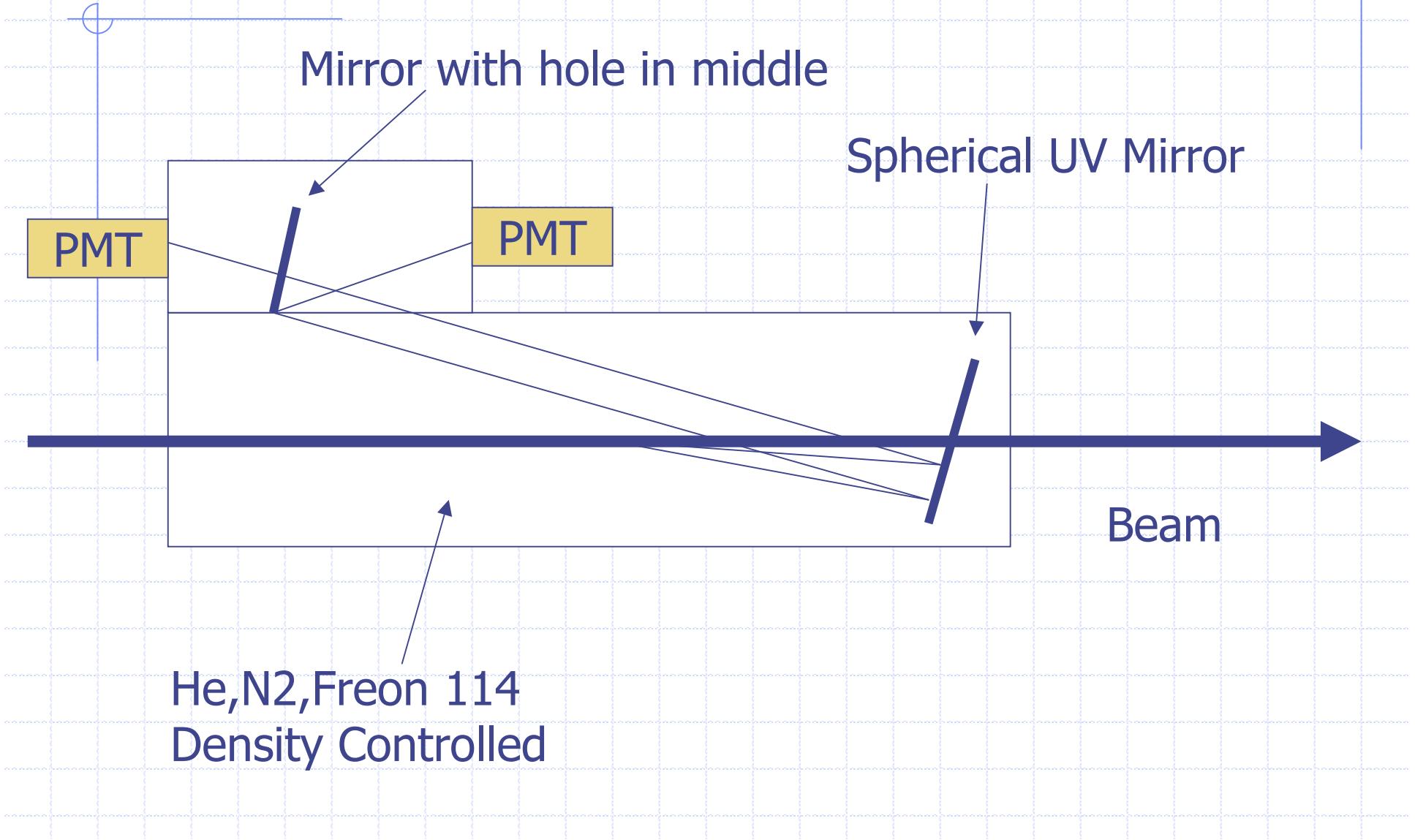
- Covers all of the threshold range
- Can extend well beyond 115 GeV/c
- More complex
- Alignment critical

Psudo-Differential CKOV

- Not a differential beam CKOV—no slit
- Measures light above a threshold angle in one PMT and light below the threshold in another PMT
- Can operate in a threshold mode



Inside the CKOV Head



Operation Modes

Proton—Kaon (8.8m pipe)

120—40 GeV/c	N2
40—20 GeV/c	Freon 114
15—10 GeV/c	timing + threshold
5 GeV/c	timing only (1.38 ns)

Kaon—Pion (24.5m pipe)

120—70 GeV/c	He
70—25 GeV/c	N2
20—10 GeV/c	Freon 114
5 GeV/c	timing + threshold

To Do

- Calculate number of photons to verify pipe lengths
 - Verify maximum angle acceptance
 - Calculate pipe obstruction effects with Freon
 - Look into trade off of pipe length, more photons or more background
 - Look at beam dispersion again
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- Refurbish detectors
 - Build gas system
 - Build and calibrate controls
 - Tabulate operating conditions